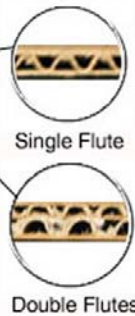
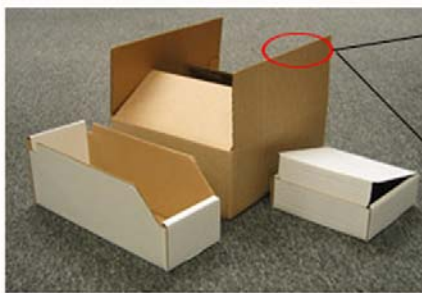


## Corrugated Cardboard Box Controlling the Viscosity in the Adhesive

95% of all products in the U.S. are shipped in corrugated boxes. This includes the fancy colored boxes as well as the plain brown boxes that hold from small items such as pizzas and light bulbs to bigger items such as computers and dishwashers.



### the glue

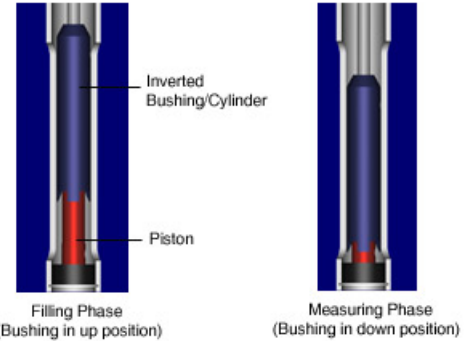
Viscosity control is needed when making batches of adhesive to glue the flutes to the liners. In the 1960's a Norcross Viscometer was first used for the corrugating adhesive application. Customers with this application usually use the sensor M8BU or M7BU.

In a tank of approximately 200 gallons/800 liters, dry starch (like cooking flour) and water are being mixed and then heated/cooked. The sensor is used during

the 'cooking' to ensure that the mixture is being cooked to the desired consistency and thickness. This process is called, 'an end point determination'. After the batch is completed it is pumped out of the tank, often called 'cooker', and sent to the machines that apply the adhesive to the flutes.

### the M8BU or the M7BU

All models with a 'U' have an inverted bushing/cylinder. An inverted bushing will prevent stray powder particles from settling in the bottom of the bushing which can distort the



piston measuring phase. Here, the principle of operation is the measuring of the bushing or cylinder falls onto the piston.

The difference between a M8BU and the M7BU is that M8BU has an explosion proof switch and the M7BU has a splashproof switch, which is beneficial to customers who use water to rinse down everything at the end of the process.

### the industry

The big players include Smurfit-Stone, Boise Cascade and Weyerhaeuser Paper who all use Norcross Viscometers. The Ringwood Company who manufactures the machines for starch mixing has, over the years, integrated Norcross Viscometers to their systems.

### the boxes

Corrugated cardboard has a wavy or ripple layer of flute (known as corrugated medium) glued to a single or double flat sheets (known as liner). The more layers the corrugated boxes have, the stronger they are.

### the process

An article from The Leading Technical Association for the Worldwide Pulp, Paper and Converting Industry explains concisely the process of making corrugated board:

'The corrugating medium, is preheated and steamed to a temperature of 212°F/100°C. This softens the paperboard, making it easier to form into flutes. The corrugating medium is drawn between a pair of gear-like cylinders called corrugating rolls which shapes the paper into a series of precise waves. Glue is applied to the tips of these flutes and the flute tips are pressed against a flat liner.'

### Corrugating Line

